REMARKS/ARGUMENT

I.   General Remarks.

Claims 1-25 are pending in the present application. As noted by the Examiner in the Office Action, Applicant previously provisionally elected claims 1-25 with traverse in response to the restriction requirement previously imposed by the Examiner. As requested by the Examiner, Applicant herein affirmatively elects claims 1-25 for prosecution on the merits.

Claims 26-64 have been cancelled herein. Applicant reserves the right to present claims 26-64 in one or more continuing applications.

II.   Rejections of Certain Claims Under 35 U.S.C. § 102(b) as Anticipated by U.S. Pat. No. 6,330,916 to Rickards et al (*"Rickards"*).

The Examiner has rejected claims 1-7, 9-12, 15, and 18-19 under 35 U.S.C. 102 (b) as anticipated by *Rickards*. Applicant respectfully disagrees, and respectfully asserts that independent claim 1 and the claims dependent therefrom are not anticipated by *Rickards*.

A.   *Rickards* Has Not Been Shown to Disclose All Elements of Applicant's Claim 1, As Required By 35 U.S.C. § 102.

Regarding independent claim 1 and dependent claims 2-7, the Examiner has stated that *Rickards*

> teaches in column 1, line 15 - column 3, line 5 [a] method of using a treatment fluid in a subterranean formation comprising introducing a treatment fluid having a density that varies as a function of pressure into a subterranean formation, wherein the treatment fluid comprises a base fluid and a portion of variable pressure weighting material particles. The reference further teaches a method wherein the treatment fluid is used as a well fluid, which is selected from the group consisting of drilling fluids, completion fluids, and stimulation fluids. Additionally, the well fluid can be selected from the group consisting of drilling muds, well cleanup fluids, workover fluids, spacer fluids, gravel pack fluids, acidizing fluids, and fracturing fluids. Finally, the reference teaches a method [comprising] the step of producing a fluid from the subterranean formation wherein the fluid comprises oil, gas, or a mixture thereof.

(Office Action, at 3-4.) Applicant respectfully traverses.

The Examiner has not shown any particle disclosed in *Rickards* to constitute a variable pressure weighting material ("VPWM") particle as required by Applicant's claim 1 and as that term is described in Applicant's specification. For example, Applicant's specification states that "[t]he VPWM particles have the capability of varying in density with external pressure; as the VPWM particles encounter higher downhole pressures, they compress, thereby reducing their volume and increasing their density . . . ." (*See* Specification, at [0027].) Elsewhere, Applicant's specification states that "the VPWM particles must be able to flex when placed under pressure, thereby changing their volume and density as a function of pressure. For example, as the VPWM particles flex inward their volume decreases, thereby increasing their density." (*See id.*, at [0031].) In contrast, the cited portion of *Rickards* has not been shown to disclose any particle having the capability of varying its volume with pressure to thereby alter its density. For example, the resin-coated proppant disclosed in Col. 2, lines 10-31 of *Rickards* has not been shown to vary in volume as a function of pressure. Nor, for example, has *Rickards'* disclosure of a fracture proppant pack comprising a mixture of thermoplastic materials with proppant material been shown to vary in volume as a function of pressure. Nor has *Rickards'* disclosure of "a blend of a fracture proppant material and a deformable beaded material" been shown to vary in volume as a function of pressure, as required in order to constitute a VPWM particle within the meaning of Applicant's invention. *Rickards'* disclosure that a particular particle may be deformable—*e.g.*, capable of changing its shape under pressure—does not constitute a disclosure that the particle is capable of changing its *volume* under pressure to thereby alter the particle's density, as required by Applicant's invention. Accordingly, Applicant respectfully submits that the Examiner has not shown that the cited portion of *Rickards* discloses a VPWM particle as required by Applicant's claim 1.

Similarly, the Examiner has not shown that any fluid disclosed in the cited portion of *Rickards* has a density that varies with pressure, as required by Applicant's claim 1. Whereas Applicant's Specification clearly states that Applicant's treatment fluids "may vary in density at particular phases of a subterranean operation (*e.g.*, drilling, fracturing, or the like) as may be necessary to adapt to the subterranean conditions to which the fluid will be subjected," *see* Specification, at [0027], and that "the presence of the VPWM particles in the treatment fluids of the present invention causes the density of the treatment fluids to vary as a function of pressure,"

see Specification, at [0039], the cited portion of *Rickards* has not been shown to disclose any treatment fluid having the same ability.

To anticipate a claim under 35 U.S.C. §102(b), a reference must teach or suggest each and every limitation of the subject claim. MPEP § 2131. Because *Rickards* has not been shown to teach a treatment fluid having a density that varies as a function of pressure, and further because *Rickards* has not been shown to teach variable pressure weighting material particles, *Rickards* has not been shown to teach or suggest every element of Applicant's independent claim 1. Accordingly, Applicant respectfully submits that independent claim 1 and claims 2-25 dependent therefrom are novel and nonobvious over *Rickards*. Applicant respectfully requests the timely issuance of a Notice of Allowance for these claims.

B.   Remarks Regarding Certain Assertions the Examiner Has Made About *Rickards*.

In addition to Applicant's statements above to the effect that *Rickards* has not been shown to anticipate Applicant's claim 1, Applicant offers the following remarks regarding certain assertions that the Examiner has made regarding the *Rickards* disclosure.

The Examiner has stated that *Rickards* "teaches in column 3, lines 56-67 a method wherein the portion of variable pressure weighting material particles is present in the treatment fluid in an amount in the range of from about 0.01% to about 40% by volume of the treatment fluid." (Office Action, at 4.) However, Applicant respectfully submits that column 3, lines 56-67 of *Rickards* describes instead a "blend including a fracture proppant material and a deformable particulate material" (*see Rickards*, Col. 3, lines 58-59), and more particularly, the respective concentrations of the components in such blend. *See id.*, at Col. 3, lines 63-64 ("The blend may include between about 1% to about 50% by weight deformable particulate material.") Accordingly, column 3, lines 56-67 of *Rickards* does not describe the concentration of the blend in a treatment fluid. Moreover, *Rickards*' blend has not been shown to be a VPWM particle within the meaning of Applicant's invention.

The Examiner also has stated that *Rickards* "teaches in column 4, lines 58-64 a method wherein a portion of the variable pressure weighting material particles can withstand a pressure of up to about 21,000 psi without crushing." (Office Action, at 4.) However, Applicant respectfully asserts that column 4, lines 58-64 of *Rickards* discloses instead that "deformable, beaded material may have a Young's Modulus of, for example, between about 500 psi and about

2,000,000 psi at in situ formation conditions. . . ." *See id.*, Col. 4, lines 59-61. Applicant interprets Young's Modulus as referring not to the pressure that a particle can withstand without crushing, but as referring instead to the ratio of stress that may be applied to a particle divided by the strain that the particle will demonstrate. *See, e.g.*, "Young's Modulus From Uniaxial Tension," *available* *at* http://www.efunda.com/formulae/solid_mechanics/mat_mechanics/elastic_constants_E_nu.cfm (last visited Dec. 21, 2005)("The modulus of elasticity in tension, also known as Young's modulus *E*, is the ratio of stress to strain on the loading plane along the loading direction. . . .") (A copy of the aforementioned reference is enclosed herein for the convenience of the Examiner.) Accordingly, Applicant respectfully submits that the Examiner has not shown that a Young's Modulus of "between about 500 psi and about 2,000,000 psi at in situ formation conditions" constitutes a disclosure that a particle can withstand a pressure of up to about 21,000 psi without crushing. Moreover, Applicant notes that the particles disclosed by *Rickards* have not been shown to constitute VPWM particles within the meaning of Applicant's invention.

III. Rejections of Certain Claims Under 35 U.S.C. § 103 as Unpatentable Over *Rickards* in view of U.S. Patent No. 6,508,305 to Brannon ("*Brannon*").

The Examiner has rejected claims 8, 13-14, 16-17, and 22-25 under 35 U.S.C. 103 as unpatentable over *Rickards* in view of *Brannon*. Applicant respectfully traverses, and respectfully asserted that independent claim 1 and dependent claims 8, 13-14, 16-17, and 22-25 have not been shown to be rendered obvious by *Rickards* in view of *Brannon*.

A. The Combination of *Rickards* and *Brannon* Has Not Been Shown to Disclose All Elements of Applicant's Independent Claim 1.

To render a claim obvious under 35 U.S.C. 103, the prior art reference (or combination of references) must teach or suggest every limitation of the subject claim. MPEP §§ 2142 and 2143. Applicant has demonstrated in Part II.A. above that *Rickards* has not been shown to disclose all elements of Applicant's independent claim 1. Furthermore, the Examiner has not asserted that the combination of *Rickards* and *Brannon* discloses all elements of Applicant's independent claim 1. Accordingly, Applicant respectfully asserts that the combination of *Rickards* and *Brannon* has not been shown to disclose all elements of Applicant's independent claim 1. Accordingly, Applicant respectfully submits that independent claim 1 and claims 2-25 dependent therefrom (including claims 8, 13-14, 16-17, and 22-25) are novel and

nonobvious over the combination of *Rickards* and *Brannon*. Applicant respectfully requests the timely issuance of a Notice of Allowance for these claims.

B. Remarks Regarding Certain Assertions the Examiner Has Made About *Rickards* and *Brannon*.

In addition to Applicant's statements above to the effect that the combination of *Rickards* and *Brannon* has not been shown to anticipate Applicant's independent claim 1, Applicant offers the following remarks regarding certain assertions that the Examiner has made regarding the *Rickards* and *Brannon* combination.

In the context of considering claims 13 and 14, the Examiner has stated that *Rickards* discloses the invention substantially as claimed, save for the limitation of including a specific compressible fluid with the variable pressure weighting material particle; *Brannon* is said to teach "in column 8, lines 32-35 a method wherein a specific compressible fluid is included with the variable pressure weighting material particle." (Office Action, at 6.) However, Applicant respectfully disagrees with the Examiner's assertion. Applicant's claims 13 and 14 recite the presence *within* a VPWM particle of a compressible fluid. In contrast, column 8, lines 32-35 of *Brannon* is only a disclosure of certain types of additives that may be mixed with a cement composition. *See Brannon*, Col. 8, lines 32-35 ("For example, a suitable hydraulic cement may be mixed with various admixtures including, but not limited to, pozzolan, blast furnace slag, hollow microspheres, nitrogen, gas generating additives, mixtures thereof, etc."). Thus, column 8, lines 32-35 of *Brannon* have not been shown to disclose that any of the cited additives may be comprised within a VPWM particle. Additionally, neither *Brannon* nor *Rickards* has been shown to disclose a VPWM particle within the meaning of Applicant's invention.

IV. Rejections of Certain Claims Under 35 U.S.C. § 103 as Unpatentable Over *Rickards* in view of Boer (2002/0108782) ("*Boer*").

The Examiner has rejected claims 20 and 21 under 35 U.S.C. 103 as unpatentable over *Rickards* in view of *Boer*. Applicant respectfully traverses, and respectfully asserted that independent claim 1 and dependent claims 20-21 have not been shown to be rendered obvious by *Rickards* in view of *Boer*. Regarding claims 20-21, the Examiner has stated that *Rickards* discloses the invention substantially as claimed, save for the limitation that the subterranean formation is located beneath the ocean floor; *Boer* is stated as disclosing "in paragraph [0010] a

method wherein the subterranean formation is located beneath the ocean floor." (Office Action, at 10.) To render a claim obvious under 35 U.S.C. 103, the Examiner must demonstrate that a prior art reference (or combination of references) teaches or suggests every limitation of the subject claim. MPEP §§ 2142 and 2143. Applicant has demonstrated in Part II.A. above that *Rickards* does not disclose all elements of Applicant's independent claim 1. Furthermore, the Examiner has not asserted that the combination of *Rickards* and *Boer* discloses all elements of Applicant's independent claim 1. Accordingly, Applicant respectfully asserts that the combination of *Rickards* and *Boer* has not been shown to disclose all elements of Applicant's independent claim 1. Accordingly, Applicant respectfully submits that independent claim 1 and claims 2-25 dependent therefrom (including claims 20-21) are novel and nonobvious over the combination of *Rickards* and *Boer*. Applicant respectfully requests the timely issuance of a Notice of Allowance for these claims.

SUMMARY AND PETITION FOR ONE-MONTH EXTENSION OF TIME
TO FILE THIS RESPONSE

In light of the above amendments and remarks, Applicant respectfully requests reconsideration and withdrawal of the outstanding rejections. Applicant further submits that the application is now in condition for allowance, and earnestly solicit timely notice of the same. Should the Examiner have any questions, comments or suggestions in furtherance of the prosecution of this application, the Examiner is invited to contact the attorney of record by telephone, facsimile, or electronic mail.

Applicant's Response to this Office Action was due on November 22, 2005. Accordingly, Applicant has included herein a Petition for One-Month Extension of Time to File this Response, along with check no. 950790 for the fee of $120.00 under 37 C.F.R. 1.136(a). The Commissioner is hereby authorized to charge Baker Botts L.L.P. Deposit Account No. 02-0383 (Order Number 063718.0163) for any underpayment, or to credit same with any overpayment of fees, in association with this filing.

Applicant believes that there are no additional fees due in association with this filing of this Response. However, should the Commissioner deem that any fees are due, Applicant respectfully requests that the Commissioner accept this as a Petition Therefor, and direct that any additional fees be charged to Baker Botts L.L.P.'s Deposit Account No. 02-0383, Order Number 063718.0163.

Respectfully submitted,

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Youngs Modulus from Uniaxial Tension

When a specimen made from an isotropic material is subjected to uniaxial tension, say in the x direction, σ_{xx} is the only non-zero stress. The strains in the specimen are obtained by,

$$
\begin{bmatrix} \varepsilon_{xx} \\ \varepsilon_{yy} \\ \varepsilon_{zz} \\ \varepsilon_{yz} \\ \varepsilon_{zx} \\ \varepsilon_{xy} \end{bmatrix} = \frac{1}{E} \begin{bmatrix} 1 & -\nu & -\nu & 0 & 0 & 0 \\ -\nu & 1 & -\nu & 0 & 0 & 0 \\ -\nu & -\nu & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1+\nu & 0 & 0 \\ 0 & 0 & 0 & 0 & 1+\nu & 0 \\ 0 & 0 & 0 & 0 & 0 & 1+\nu \end{bmatrix} \begin{bmatrix} \sigma_{xx} \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}
$$

The modulus of elasticity in tension, also known as **Young's modulus E**, is the ratio of stress to strain on the loading plane along the loading direction,

$$ E = \frac{\sigma_{xx}}{\varepsilon_{xx}} $$

Common sense (and the 2nd Law of Thermodynamics) indicates that a material under uniaxial tension must elongate in length. Therefore the Young's modulus E is required to be non-negative for all materials,

$$ E > 0 $$

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Poisson's Ratio from Uniaxial Tension

A rod-like specimen subjected to uniaxial tension will exhibit some shrinkage in the lateral direction for most materials. The ratio of lateral strain and axial strain is defined as **Poisson's ratio ν**,

$$ \nu = -\frac{\varepsilon_{yy}}{\varepsilon_{xx}} $$

The Poisson ratio for most metals falls between 0.25 to 0.35. Rubber has a Poisson ratio close to 0.5 and is therefore almost incompressible. Theoretical materials with a

Poisson ratio of **exactly 0.5** are truly **incompressible**, since the sum of all their strains leads to a zero volume change. Cork, on the other hand, has a Poisson ratio close to zero. This makes cork function well as a bottle stopper, since an axially-loaded cork will not swell laterally to resist bottle insertion.

The Poisson's ratio is bounded by two theoretical limits: it must be greater than -1, and less than or equal to 0.5,

$$-1 < \nu \leq \frac{1}{2}$$

The proof for this stems from the fact that E, G, and K are all positive and mutually dependent. However, it is rare to encounter engineering materials with negative Poisson ratios. Most materials will fall in the range,

$$0 \leq \nu \leq \frac{1}{2}$$